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## **EUROPEAN PATENT APPLICATION**

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(54) A sterilizable steam heating device

(57) A device (10) for producing a heated milk-air emulsion comprises, at the inside thereof, circulation paths for steam, milk and air towards a delivery outlet (11). A blocking means (20) is drivingly slidable to close the delivery outlet (11) and thereby enable execution of an inner-cleaning cycle in the device on activation of steam circulation. Advantageously, the delivery outlet (11) is formed of a duct (25) the free end (26) of which is of tapered shape. Axially disposed inside duct (25) is a dispenser (27) at which the circulation paths arrive and which has radial passageways (28) opening into the duct (25). For accomplishment of the blocking means, the duct and dispenser are axially slidable relative to each other to bring the dispenser (27) to a sealing contact position against the duct (25) thereby closing passage of same to the outside.

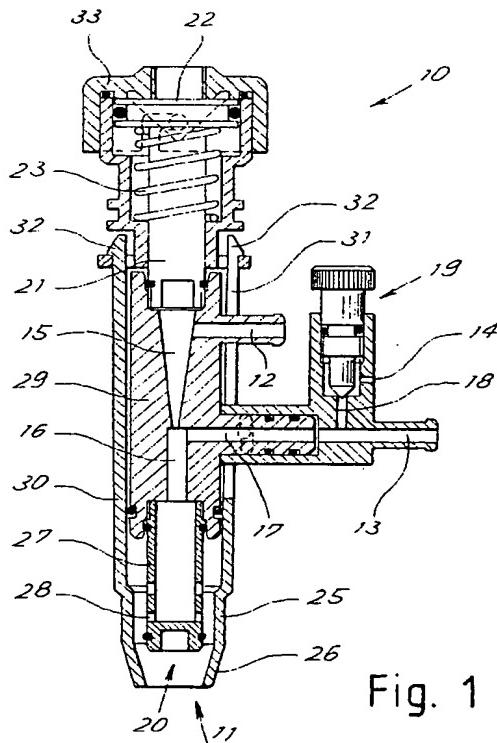


Fig. 1

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## Description

The present invention relates to an steam heating and/or emulsifier device for milk (like as a "cappuccino-making" device) or other beverages.

A problem arises in such devices in that cleaning operations are of difficult accomplishment. Actually, the small inner ducts, often inaccessible, can easily become a breeding-ground for moulds and bacteria, or in any case can house deposits that are to be eliminated.

It has been proposed that the same steam used for heating and/or generating the heated emulsion should be also employed for cleaning and sterilizing all the device ducts at high temperature. In the devices of the known art however, operations to be executed for steam-cleaning and sterilization are relatively complicated and can cause faults.

The general object of the present invention is to obviate the drawbacks of the known art by providing a steam heating device which enables an easy and safe steam-cleaning.

In view of the above object, in accordance with the invention, a steam heating device for producing a heated (beverage) has been conceived which is provided at the inside thereof with paths enabling steam and beverage, to circulate to a delivery outlet, characterized in that it comprises drivingly slideable blocking members for closing the delivery outlet, so that an inner-cleaning cycle may be performed on operation of the steam circulation.

For better explaining the innovative principles of the present invention and the advantages it offers over the known art, a possible embodiment of same applying said innovative principles will be disclosed hereinafter, by way of non-limiting example, with the aid of the accompanying drawings. In the drawings:

- Fig. 1 is a longitudinal sectional view of a device in accordance with the invention, at a first position of normal operation;
- Fig. 2 is a partly sectioned longitudinal view of the device in Fig. 1, at a second position for cleaning. With reference to the drawings, a steam heating device 10, that is a device for producing a heated beverage or a milk-air emulsion, is internally comprised of circulation and mixing paths for steam, beverage and, if required, air to a delivery outlet 11.

The device 10 comprises a steam-flow inlet 12, a beverage-admission inlet 13 and an air inlet 14. For example, the beverage is milk. The circulation paths comprise an axial chamber 15 into which steam from inlet 12 is introduced. Chamber 15 tapers for opening into a chamber 16 of greater diameter at the radial arrival point of a duct 17 connected to the milk inlet 13. In this way, the steam flow entering the chamber of greater diameter 16 sucks the milk from the milk-supply duct. Radially opening into the milk-supply duct 17 is a duct 18 for air

admission from inlet 14. On passage of the milk flow along duct 17, air is drawn in from duct 18. In this manner air is emulsified with milk. A needle valve 19 is located along the air duct for regulating the amount of sucked air in the milk-supply duct.

5 A substantially known art has been hitherto described. In accordance with the invention, the device 10 comprises blocking means 20 that is drivingly slideable for closing the delivery outlet 11. The blocking means is controlled by an actuator 21. Actuator 21 can be of a mechanical, electric, pneumatic, etc. type.

10 For example, it could consist either of a mere push-button to be operated manually, or of a plunger 22 that, against the action of a spring 23, moves the blocking means. Advantageously, the plunger can be operated by a steam flow reaching the device through a duct 24.

15 Advantageously, the delivery outlet 11 is made up of a duct 25 the free end 26 of which is of tapered conformation. Axially disposed within duct 25 is a dispenser 27 to which the circulation passageways through chamber 16 come. Dispenser 27 has radial passageways 28 opening into duct 25.

20 As shown in Fig. 1, when the device is in a normal operating condition, an annular passageway is defined between the duct 25 and dispenser 27 for drivingly emitting the emulsion from outlet 11. As shown in Fig. 2, duct 25 and dispenser 27 are axially slideable relative to each other so that, on the actuator operation, the dispenser is biased into sealing contact against the inner tapered portion 26 of the duct, thereby closing passage to the outside and embodying the outlet blocking means.

25 Advantageously, the dispenser moves integrally with a body 29 of the device inside which the circulation passageways are formed, whereas the tapered duct 25 extends rearwardly to form a chamber or sliding casing 30 slidably receiving an axial portion of said body.

30 Ducts 12 and 13 and the valve unit 19 project from the casing 30 through a side slit 31. The actuator body is snap-fastened to the casing 30 by means of locking tabs 32.

35 Still advantageously, the valve unit 19 together with the starting portion of duct 17, can be bayonet-disconnected from body 29, in addition to partly rotating about the axis of duct 17.

40 At this point it is apparent that the intended purposes have been achieved. In normal operating conditions, the device is as shown in Fig. 1, so that it is sufficient to send steam to inlet 12 to enable the heated emulsion to come out of the outlet 11, as in the known art. When an inner-cleaning cycle is desired, operation of the actuator is sufficient, in order that the blocking means may close the outlet 11 as shown in Fig. 2. By sending steam to inlet 12, a steam circulation occurs that moves up along the ducts located inside the device and sterilizes them.

45 50 55 In any case, as clearly viewed from the figures, the described device can be easily disassembled should a thorough cleaning be required. Actually, removal of the upper bayonet-fastened plug 33 is sufficient to enable

the whole inner set to be taken out, which set can be further dismantled into its individual components.

Obviously, the above description of an embodiment applying the innovative principles of the present invention is for purposes of illustration only and is not to be interpreted as a limitation of the scope of the invention as herein claimed.

For example the shape of the inner device ducts can be different from that herein shown.

The needle valve can be omitted or completely closed. In this manner, the device became a steam heating device without emulsifier. The heating device can be used for heating milk, coffee, chocolate, etc.

### Claims

1. A steam heating device for producing a heated beverage comprising, at the inside thereof, paths enabling steam and beverage to circulate towards a delivery outlet (11), characterized in that it comprises drivingly slidable blocking means (20) for closing the delivery outlet (11), so that an inner-cleaning cycle may be performed on operation of the steam circulation.

2. A device according to claim 1, characterized in that the delivery outlet (11) consists of a duct (25) the free end (26) of which is of tapered shape, at the inside of said duct (25) a dispenser (27) being axially disposed at which said circulation paths arrive and which is provided with radial passageways (28) opening into the duct (25), which dispenser and duct are axially slidable relative to each other, so as to bring the dispenser (27) to a sealing contact position against the duct (25) and to close passage of same to the external environment, thus embodying said outlet blocking means.

3. A device according to claim 1, characterized in that the dispenser (27) is slidably moved to a contact position with the duct, against the action of a spring (23), by means of an actuator (21) coaxial with the dispenser.

4. A device according to claim 1, characterized in that the dispenser (27) moves integrally with a body (29) of the device inside which said circulation paths are made.

5. A device according to claim 4, characterized in that the tapered duct (25) extends rearwardly to slidably receive an axial portion of said body (29).

6. A device according to claim 1, characterized in that the circulation paths are comprised of a steam-receiving axial chamber (15) which tapers for opening into a chamber (16) of greater diameter at a radial

arrival point of a duct (17) for beverage supply, the steam flow entering the chamber of greater diameter (16) sucking beverage from the beverage-supply duct, a duct (18) for air admission radially opening into the beverage-supply duct 17 for emulsifier the beverage.

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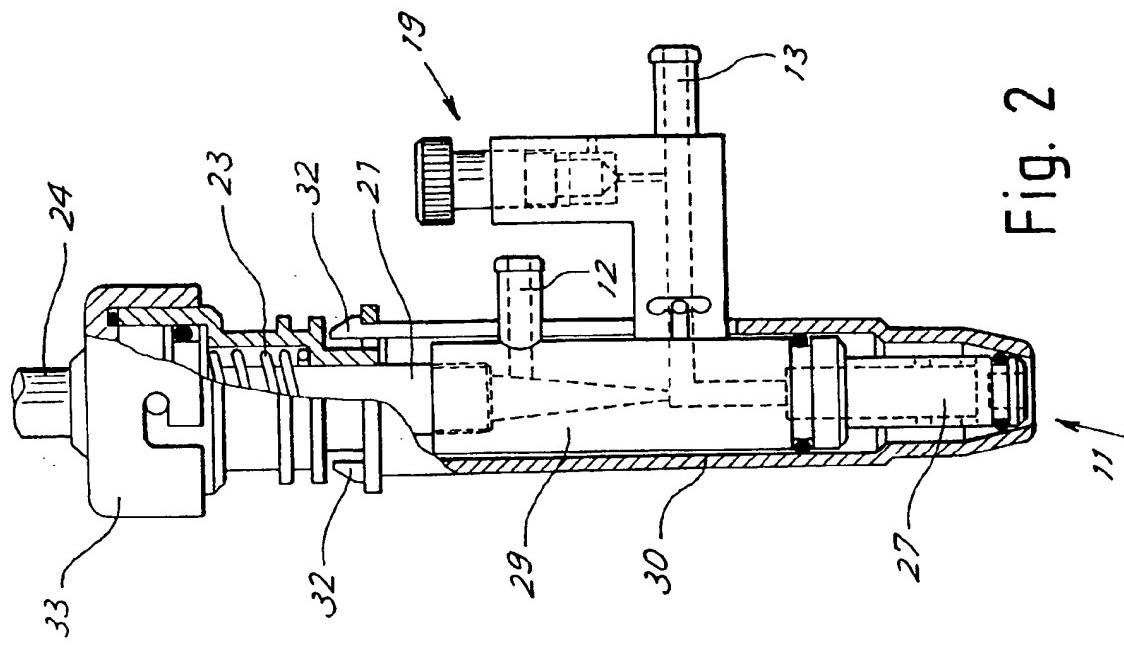


Fig. 2

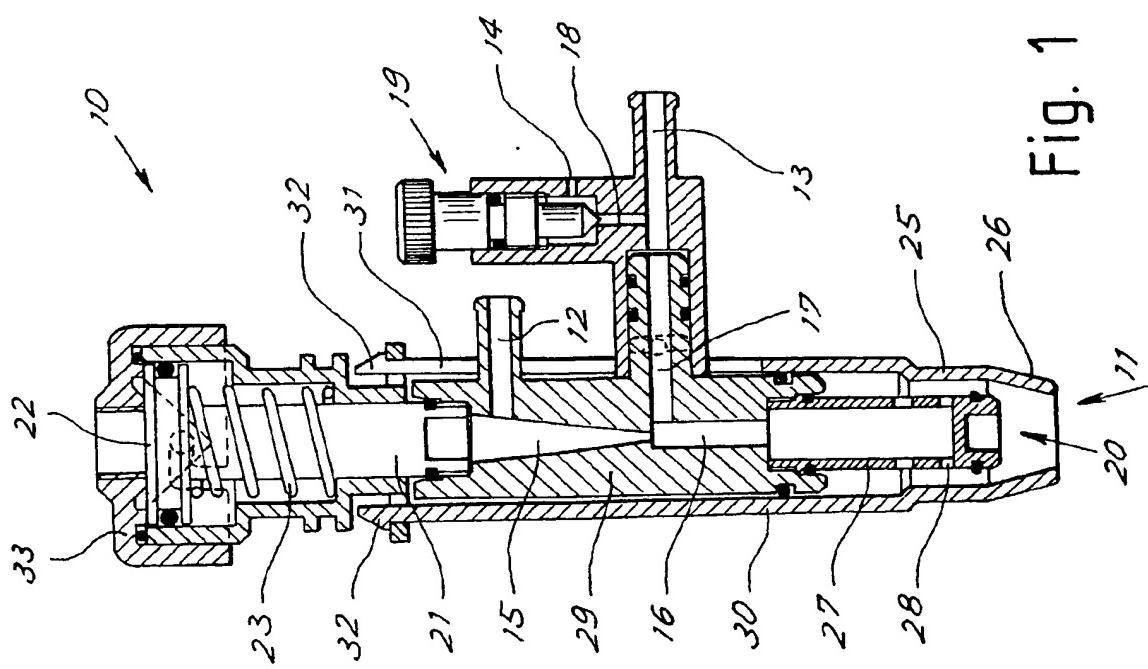


Fig. 1

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## EUROPEAN SEARCH REPORT

Application Number  
EP 97 20 1109

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DOCUMENTS CONSIDERED TO BE RELEVANT									
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)						
A	FR 2 638 083 A (FREGNAN FLORINDO CONSTRUZIONI MACCHINE DA CAFFÈ ELEKTRA) * page 3, line 24 - page 4, line 17; figure 2 *	1,2,6,7	A47J31/46						
A	EP 0 344 859 A (L. GROSSI). * column 4, line 31' - line 39; figure 3 *	1							
A	EP 0 472 272 A (CAFFE ACORTO INC.). * page 5, line 37 - line 51; figures 1,2,13A-B *	1							
A	DE 40 35 270 A (S. DI GIROLAMO) -----								
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)						
			A47J B67D						
<p>The present search report has been drawn up for all claims</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Place of search</td> <td style="width: 33%;">Date of completion of the search</td> <td style="width: 34%;">Examiner</td> </tr> <tr> <td>THE HAGUE</td> <td>31 July 1997</td> <td>Schmitt, J</td> </tr> </table> <p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone  Y : particularly relevant if combined with another document of the same category  A : technological background  O : non-written disclosure  P : intermediate document</p> <p>T : theory or principle underlying the invention  E : earlier patent document, but published on, or after the filing date  D : document cited in the application  L : document cited for other reasons  &amp; : member of the same patent family, corresponding document</p>				Place of search	Date of completion of the search	Examiner	THE HAGUE	31 July 1997	Schmitt, J
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